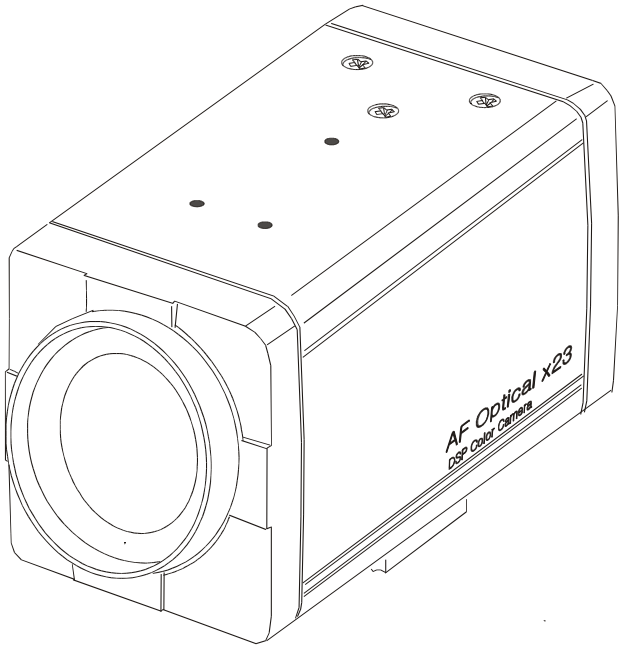
OPERATION MANUAL

Built-in x 23 ZOOM
AUTO FOCUS COLOR CAMERA



WDAC-2308X
WDN-2308X

READ AND KEEP THIS OPERATION MANUAL

WELDEX CORPORATION

CAUTION

RISK OF ELECTRIC SHOCK

DO NOT OPEN

CAUTION:
TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE.
PREFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

Indicate a potentially hazardous situation which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Warning:
This equipment generates and uses radio frequency energy and if not installed and used properly, I.e., in strict accordance with the instruction manual, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Warning:
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

CAUTION FOR SAFE OPERATION

1. Water and Moisture

To prevent fire or shock hazard, do not expose this camera to rain or moisture.

2. Servicing

Do not attempt to disassemble or repair by yourself. You may be exposed to dangerous voltage or other hazards. Note that all servicing is qualified service personnel. Modifications not approved by manufacturer could void the user's authority to operate the equipment.

3. Power Sources

To prevent electric shocks and risk of hazards, do NOT use more than the specified power source.

4. Environment

Do not install too warm or too cold place. Recommended operation temperature is between -5℃ and 60℃

5. Sunlight

Do not point the camera at the sun. CCD can be damaged.

6. Heavy Shock and Vibration

Do not drop the camera or subject it to heavy shock of vibration.

7. Install on an Unstable Place

Do not place or install this camera on an unstable place, stand, tripod, bracket or table. That may cause serious injury to people or damage to appliance.

8. When operation is incorrect or a malfunction is observed

While operating, if any abnormal condition (strange sound, smell or smoke) or a malfunction (no pictures, etc.) is observed, stop using the camera immediately, turn the power off, then contact your supplier.

9. Cleaning

Turn the power off and wipe off the dirt with a dry soft cloth. If it is extremely dirty, use furniture cleaner to wipe it off. To clean the lens, use a blower or lens cleaning tissue. (available from any camera dealer)

10. Do not shoot any source of bright light.

If the objects contain very bright areas, bright vertical or horizontal lines may appear on the screen. This is called "smear", a Phenomenon which often occurs with solid - state pickups, and is not a malfunction.

11. Damage Requiring service

Unplug the camera from the power source and refer servicing to qualified service personnel under the following condition:

a. If the power-supply cord or plug is damaged.
b. If the camera has been exposed to rain or water.
c. If liquid has been spilled, or objects have fallen into the camera.
d. If the camera does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the camera to its normal operation.
e. If the camera has been dropped or the cabinet has been damaged.
f. If the camera exhibits a distinct change in performance.

CONTENTS

Thank you for using this Auto Focus Zoom Color Camera. To get the best efficiency, read carefully all instructions in this manual before use, and keep this manual for reference. If you have any problems with this camera, contact your supplier to service.

1. Features

Ideal Digital Video Camera for Security

The WDAC-2308X is a compact camera that offers easy system integration.Coming with the built-in zoom lens,the user can monitor the scene from variable angle without the extra lens.
And,with the D.S.P. technology,such intelligent controls as auto iris , auto back light compensation and auto white balance are possible to realize clear detailed picture. Additionally,through RS-232C/RS-485 linkage, remote Focus/Zoom operations are also possible,along with manual control.All these features including highly sensitive 1/4-inch CCD make the ideal digital processing CCTV camera GC-655N/P more effective surveillance activities.

Built-in Optical power zoom lens

The WDAC-2308X with highly durable built-in zoom lens offers auto focus, auto iris , and optical zoom functions enabling the user to monitor a scene with clarity in any desired angle of view. With the x23 optical zoom lens and up to x8 digital zoom processing,zoom ratio of the GC-655N/P is expanded to x184.

High Resolution & sensitivity SONY CCD

The chassis features a highly sensitive 1/4-inch CCD pickup with approximately 440,000) effective pixels
minimizing residual image and geometric distortion. All images are reproduced with a high horizontal resolution of 470) TV lines for fine detail.

Remote Control through RS232C/RS485 Interface

Remote control operations are possible through RS232C/RS485 interface for Focus and Zoom (optical:up to x23,digital ~ x8) control. In addition,the unit lets you command white balance and exposure manually using RS232C/RS485 interface.

Compact size for various applications

The WDAC-2308X comes in the compact aluminum case enabling the users put the unit into the other forms of other outer case (such as large dome camera or built in P/T/Z applications) according to the particular purpose.

AI / Fuzzy Control Circuit with DSP

Advanced DSP(Digital Signal Processor) technology automatically adjusts operations such as Iris , White Balance flexibly adapting to environmental conditions.

Auto Iris **:** the iris is adjusted so that visual output is kept at a fixed level,even if brightness of the surrounding changes.

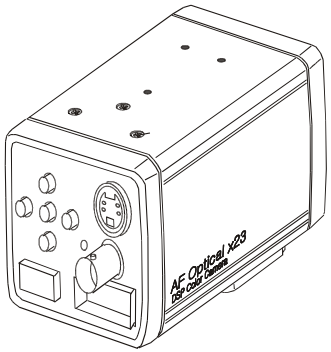
Auto White Balance **:** color adjustment according to the color temperature of the light source illuminating the subject. white balance can be obtained even with fluorescent lights, halogen lamps or outdoor.

Manual Function Control(Key or Using RS-232C)

Following functions can be controlled manually

1) NEGA/POSI ;Negative/Positive
2) Digital Zoom ; x2 ~ x8 (Addition to Optical Zoom)
3) Iris Control ; Auto/Manual (Manual Iris level UP/DOWN)
4) AGC ; 8 dB ~ 38 dB Adjustable
5) White Balance ; Auto/Manual/Indoor/Outdoor/ATW
6) Manual White Balance ; R,B UP/DOWN
7) 64 Positions Zoom/Focus Preset
8) Power ON/OFF
9) Quick Zoom Control ; TELE/WIDE
10) Focus ; Auto/Manual/One shot (PushAuto)
11) Manual Focus ; NEAR/FAR
12) On Screen Display Menu ; ALL Display / only Top / only Bottom Display off
13) 28 Steps Shutter Speed Control
14) Back Light Compensation ; ON/OFF/AUTO
15) Back Light level ; 00 ~ 80
16) Color ; ON/OFF
17) Mirror ; ON/OFF
18) Zoom Speed ; High/Medium/Low
19) Oneshot AF time ; 1 sec ~ 9 sec
20) AF sensitivity ; High/Low
21) Communication Baud-rate ; 1,200bps ~ 115,200bps
22) AE sensitivity ; High/Low
23) Minimum shooting distance ; 1cm ~ Infinity (∞)
24) simple privacy area masking ; 6 areas

2. Names & Functions



FAR(-) BUTTON

TELE(UP) BUTTON

NEAR(+) BUTTON

MENU DISPLAY BUTTON

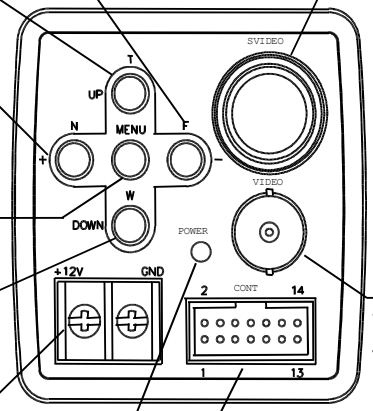
WIDE(DOWN) BUTTON

POWER INPUT TERMINAL

DC 12V input
(Please use a specified DC adaptor)
(Be careful its polarity)

POWER ON LAMP

In power ON state , this LED is ON .



S-VIDEO OUTPUT

This is the output terminal
for separate Y/C signal .

VIDEO OUTPUT

This is the output terminal
for composite video signal

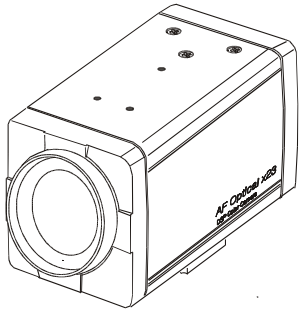
CAMERA CONTROL CONNECTOR

This is the 14 pin connector for external
camera controls .
(Refer to 4. CAMERA CONTROL METHODS)

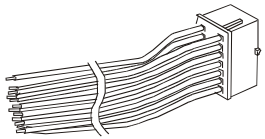
3. Installation

3.1 Check all accessories with enclosed package .

-WDAC-2308X SET
- 14 PIN CONNECTION CABLE
- OPERATION MANUAL (ENGLISH EDITION)



WDAC-2308X



14 PIN CONNECTION CABLE

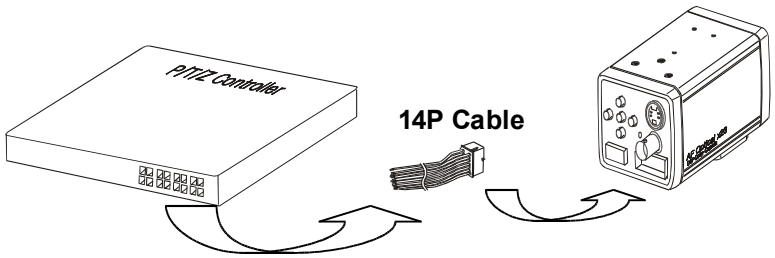
OPERATION MANUAL

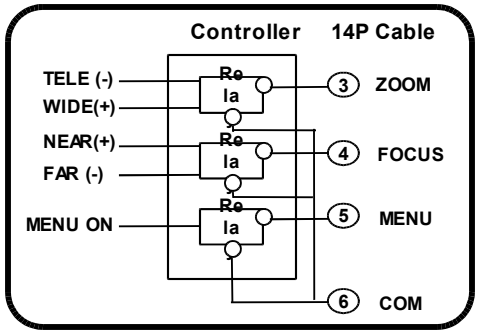
14P CABLE DESCRIPTION ;

1.	**KEY1 (RED)**	**2.**	**KEY2 (YELLOW)**
3.	**ZOOM (GREEN)**	**4.**	**FOCUS (BLUE)**
5.	**MENU (WHITE)**	**6.**	**COM (ORANGE)**
7.	**GND (BLACK)**	**8.**	**GND (BLACK)**
9.	**R+/NC (BROWN)**	**10.**	**R-/RD (PINK)**
11.	**T+/TD (VIOLET)**	**12.**	**T-/GND (GRAY)**
13	**EXT_VD (WHITE)**	**14.**	**GND (BLACK)**

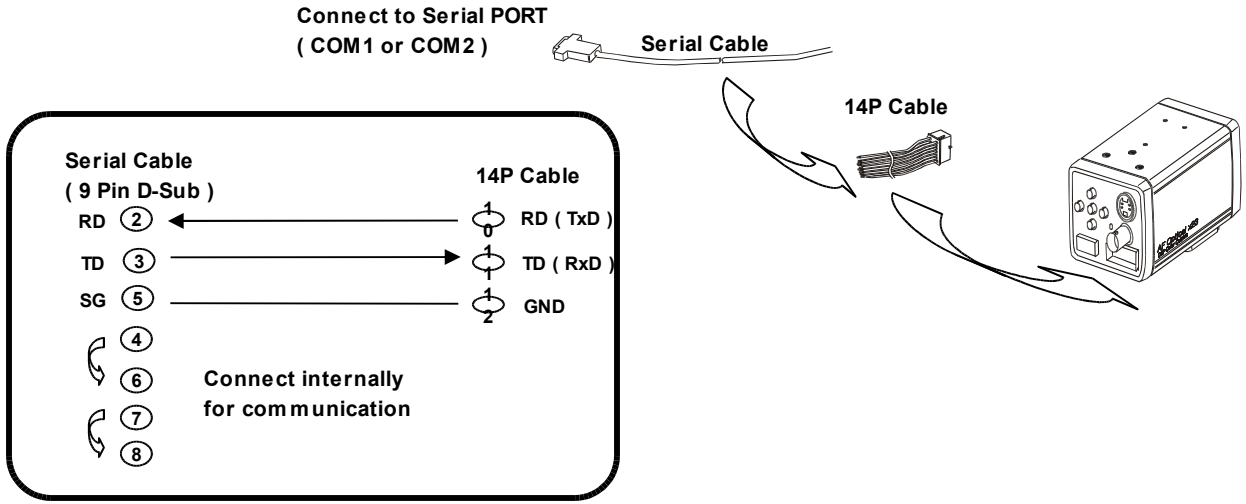
4. Camera Control Methods

4.1 Remote Control using for Hard wired connection (Connector pin 3,4,5,6)

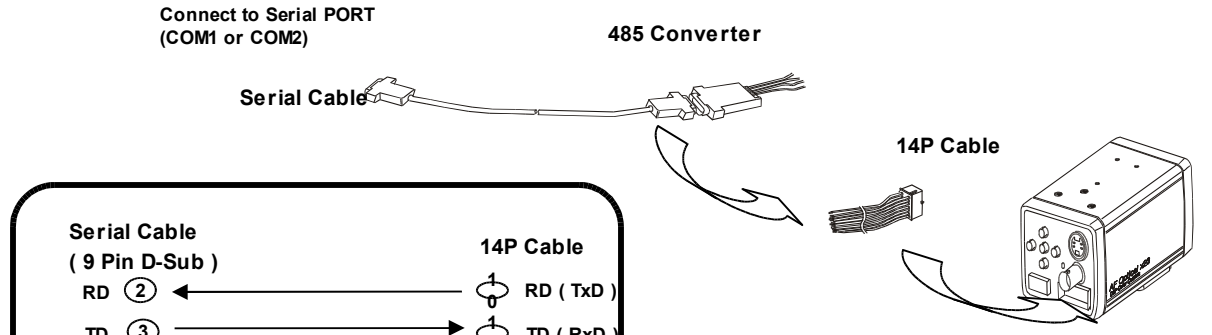


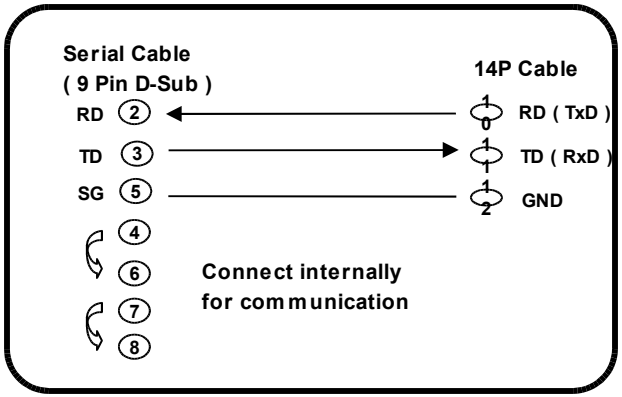


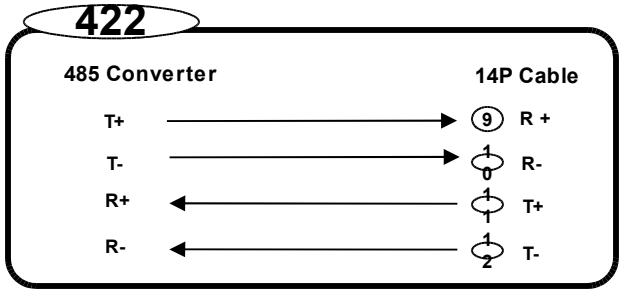
4.2 Remote Control using for RS-232C connection (Connector pin 10,11,12)

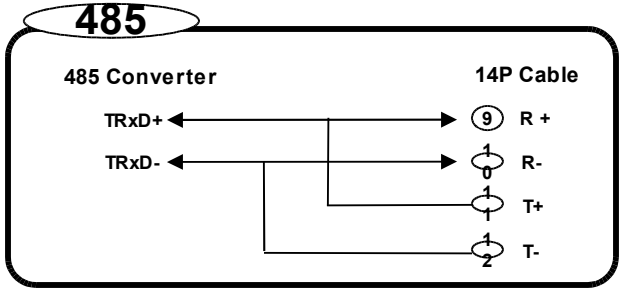


4.3 Remote Control using for RS-422/485 connection (Connector pin 9,10,11,12) -------- OPTION

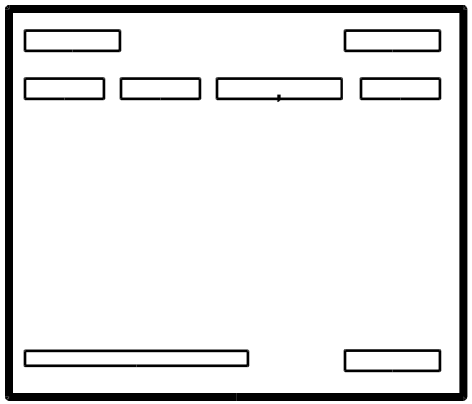








5. On Screen Display



<Fig5-1. Operating OSD display position>

5.1 How to display Operating OSD

a. Pressing the MENU key softly confirm current Operating OSD.
It is disappeared about five seconds later if there are no other key actions.

b. When it zoom in or out pressing TELE(up) or WIDE(down) key,
whole Operating OSD is displayed and then disappeared.
Press NEAR(+) , FAR(-) key, only upper part of Operating OSD
(for displaying camera mode) is displayed and then disappeared.
(It is for checking current whole camera mode and zoom position)

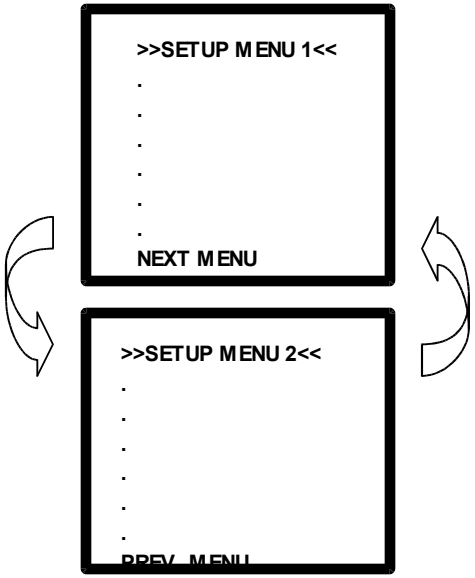
c. Even though Operating OSD is disappeared,
it keep displaying ID in lower part of screen.
In order to do not display ID, one method is to change EEPROM data
of Camera, the other is to use external communication through RS-232C.

d. Using RS-232C communication, change display position of ID;
Bottom Right -> Top Left -> Top Right -> Non display.

* If display Operating OSD is not needed by special purpose
like using external text overlay board, it can be OFF mode at all times
through external communication control as RS 232C.

	FUNCTION	OSD Format	DESCRIPTION
①	Focus Mode	Non display	Auto Mode
		MF	Manual / Push_Auto Mode
②	Back Light	Non display	Back Light OFF
		BL	Back Light ON
③	Flickerless	Non display	Flickerless OFF
		FL	Flickerless ON
④	Shutter Speed	Non display	Normal Shutter (NTSC:1/60 PAL :1/50)
		1 / 125 . . . . 1 / 1 0, 0 0 0	28 variable steps.
⑤	WB MODE	ATW	Auto Trace White Balance
		IN	Indoor Preset (3200°K)
		OUT	Outdoor Preset (5400°K)
		MWB	Manual WB mode
		AWC	One Push mode
⑥	ZOOM DISPLAY	x23	Optical zoom
		Dx50	Digital zoom
		>> TELE	zoom TELE
		<< WIDE	zoom WIDE
⑦	CAMERA ID	Non display	In case that ID is 0
		ID : 002	In case that ID is 1 ~ 255

<Table5-1. Operating OSD description>



<Fig5-2. SETUP MENU change>

<<SETUP MENU 1>>

① BACKLIGHT	OFF
② COLOR	ON
③ NEGATIVE	OFF
④ MIRROR	OFF
⑤ SHARPNESS	10
⑥ BRIGHTNESS	48
⑦ FLICKERLESS	OFF
⑧ MAX AGC	34dB
⑨ INITIAL SET	ON

NEXT MENU

<Fig5-3. SETUP MENU 1 >

5.2 Display SETUP MENU

a. Press MENU key above 2 seconds so that SETUP MENU 1 is displayed on the screen.
b. Select item of SETUP MENU using TELE(up) / WIDE(down) key.
c. NEAR(+) / FAR(-) key is used to increase / decrease data of selected item.

5.3 Move between SETUP MENU 1 and SETUP MENU 2

a. In order to change from SETUP MENU1 to SETUP MENU 2, select NEXT MENU using TELE / WIDE key, and press NEAR / FAR key.
b. In order to change from SETUP MENU 2 to SETUP MENU1 , select PREV. MENU using TELE / WIDE key, and press NEAR / FAR key.

5.4 Quit SETUP MENU

a. Press the MENU key again. SETUP MENU is disappeared, "SAVE?" or "QUIT?" is displayed at center of screen. If there is no change of adjustment state of Camera, "QUIT?" is showed, else " SAVE?" is showed.
① "QUIT?" : quit SETUP MENU without saving changed value.
② "SAVE?" : quit SETUP MENU with saving changed value.

b. Press NEAR / FAR key to choose, and press the MENU key again. whole SETUP MENU is quitted.
(If MENU key is not pressed and TELE / WIDE key is pressed, SETUP MENU is appeared again.)

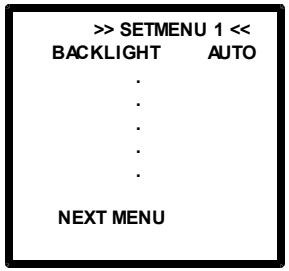
5.5 SETUP MENU 1 functions

① Backlight Compensation
: It is for preventing the center object too darken when the excessive light is behind the center object. Press NEAR/ FAR key so that Backlight mode switch ON/OFF. Set BACKLIGHT ON, then brighten the center object in the contrast to the background light. Press NEAR/ FAR key in 2 sec, Backlight mode become AUTO. When mode is AUTO, camera discriminate backlight condition and compensate automatically. It can be changed backlight detection region of screen .
According to changing backlight region its control is more smoothly and becomes proper brightness status.
BACKLIGHT **OFF → ON → (AUTO) → . . . .**

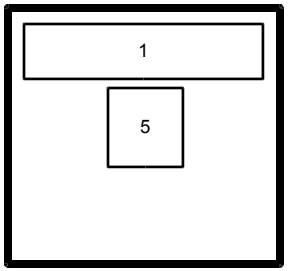
② COLOR / Black&White Mode
: Use for changing color and monochrome (black & white)mode .
ON is Color mode, OFF is black&white mode.
COLOR **ON → OFF → . . . .**

③ Positive / Negative Mode
: Use for Positive and Negative mode. ON is Negative mode, OFF is Positive mode namely general screen state.
NEGATIVE **OFF → ON → . . . .**

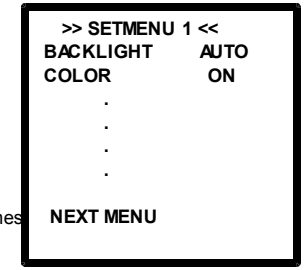
i) Set AUTO BLC mode



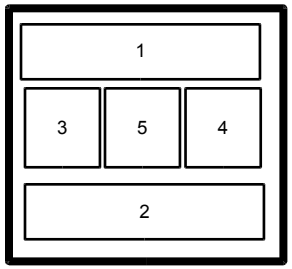
Press NEAR(+) or FAR(-) key above 2 sec, then Backlight mode becomes Auto.



Press MENU key , then displayed backlight area that can be modifying (Refer to B)

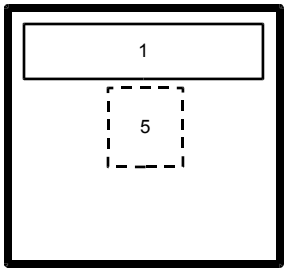


Press MENU key , then displayed SETUP MENU1 again. At this time bellow item (color ON/Off)becomes blinking status.

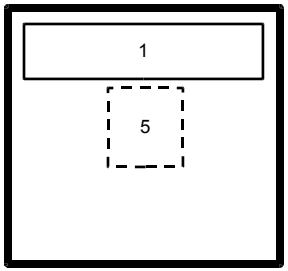


< Fig 5-4. Five BLC areas >

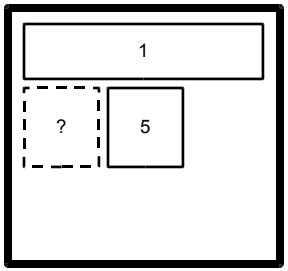
ii) Set BLC area in Backlight Auto mode



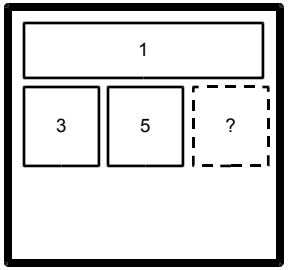
If you want to change BLC area , Move to desirable area using TELE(up)/WIDE(down) key .



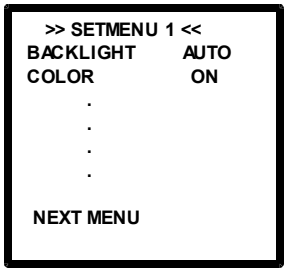
If you want to remove current selected area , Press NEAR(+)or FAR(-) key , current area is removed.



The selected area becomes blinking.



Press NEAR(+)or FAR(-) key , New area is selected, next area is blinking. It can be selected or removed all 5 areas with above setting method repeatedly.



Press MENU key , then PREV. to previous SETUP MENU 1.

④ Mirror Mode
: Mode ON is Mirror mode, Mode OFF is general screen state.
MIRROR **OFF → ON → . . . .**

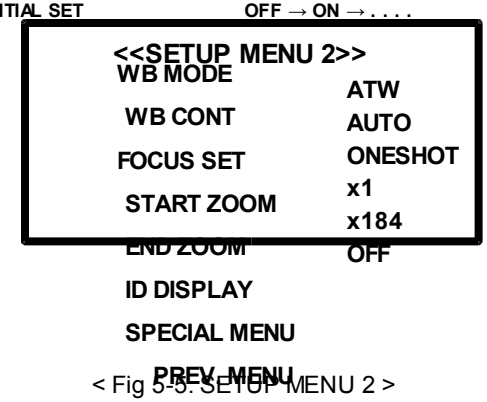
⑤ Sharpness Control
: Use to change the contour of scene .
SHARPNESS **0 ~ 15**

⑥ Brightness Control
: Adjust open and close level of iris in AI mode. The normal value is 48(50)
The smaller brightness value is, the darker it is, because iris is closed more. On the contrary the bigger brightness value is, the brighter it is, because iris is opened more.
BRIGHTNESS 0 ~ 99

⑦ Flickerless Mode
: Set FLICKERLESS ON to remove the flicker of picture.
Shutter speed is fixed as 1/100(NTSC) sec, 1/120(PAL) sec .
FLICKERLESS OFF → ON → . . . .

⑧ Max AGC control
: Set AGC level.
MAX AGC **OFF → 8dB → 10dB → . . . . → 36dB → 38dB**

⑨ INITIAL SET Mode
: Set the INITIAL SET Mode ON so that all changed data are returned to shipping condition. Mode becomes OFF if SETUP MENU state is different from shipping condition.
INITIAL SET **OFF → ON → . . . .**



< Fig 5-5. SETUP MENU 2 >

5.6 SETUP MENU 2 functions

White Balance Mode
: Outer illumination condition is expressed by Color temperature ,Kelvin (°K). It is White Balance that shows white as white in any illumination conditions. It is composed of five modes.
ATW (Auto Trace White balance)
: do automatically under any condition in range 2,800°K ~ 8,000°K
It can be adjustable red and blue point of desired white position
INDOOR (Indoor Preset WB)
: Use to set the preset illumination condition as 3200°K.
OUTDOOR (Outdoor Preset WB)
: Use to set the preset illumination condition as 5400°K.
MANUAL (Manual WB)
: Use to adjust to desired color temperature manually.
(0 ~ 99 decimal value)
AWC (Auto White Control)
: Consider current illumination condition, do white balance by force and lock as manual.

White Balance Mode Control
: It displays and changes White Balance Mode Control status of Camera.
ATW **AUTO (It doesn't need to adjust.)**
INDOOR **3200°K (It doesn't need to adjust.)**
OUTDOOR **5400°K (It doesn't need to adjust.)**
MANUAL **50 (It can be adjust)**
AWC **LOCK → PUSH → . . . .**
(*LOCK means Manual white balance status. Press NEAR(+) / FAR(-) key continuously, LOCK mode becomes PUSH mode and white balance acts automatically, and then white balance mode is locked as manual.)*

Set Focus Mode
: It is composed of three modes.
AUTO : Use to focus automatically all the time.
MANUAL : Use to focus manually by pushing NEAR(+) / FAR(-)key.
Even though MANUAL mode, it will be focused in about 5 seconds after zoom in(TELE) / out(WIDE), and return to MANUAL mode automatically.
This is for focusing accurately after zooming.
ONESHOT(option) : It is similar to MANUAL mode.
But there are some difference.
In case the focus mode is ONESHOT, it is focused whenever ONESHOT (AUTO/MANUAL key) key is pushed. It will be returned to MANUAL mode after the fixed seconds even though can not be found best focus.
(Taking time is able to set in Special Menu.) In this case
push ONESHOT(AUTO/MANUAL key) key again, it will be in best focus.
PUSHAUTO(option) : While pushauto key is pushing, focus mode is auto

☞ *caution*
1. According to Model, focus mode is Auto -> Manual -> Oneshot or Auto -> Manual -> Pushauto.

Set Start Zoom ratio
: Set boundary value of WIDE zooming.
START ZOOM **x 1 ~ x 22** (in optical zoom region)

Set End Zoom ratio
: Set boundary value of TELE zooming. It can be set up to 184 x including electronic zoom. (in case the digital zoom limit is 8 times) Since Start Zoom and End Zoom ratio are set, simultaneously Camera moves to setting zoom times. So it can be enable to adjust in moving to desired position.
END ZOOM **x 23 ~ x 184** (in digital zoom region)

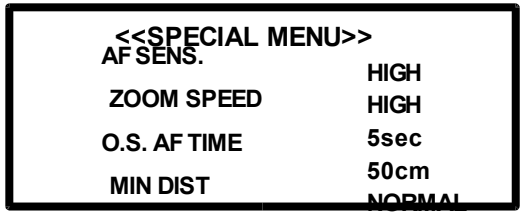
☞ *caution*
1. End Zoom value must be lager than Start Zoom ratio.

Camera ID Display Mode
: Camera ID is indicating number assigned each Camera in case of controlling many Cameras. It is from 0 to 255. But in case of 0, that is not displayed on screen. It is always displayed even though whole Operating OSD is disappeared on the screen. But it is possible to make non display and to choose display position (BOTTOM RIGHT, TOP RIGHT, TOP LEFT) by RS-232C communication.
ID DISPLAY **0 ~ 255**

☞ *caution*
1. In case of Camera ID FIX model, it cannot be selected.

Special Menu (Option)
: Use for Entering Special Menu.

5.7 SPECIAL MENU functions



< Fig 5-3 SPECIAL MENU >

AF SENS. Control
: **High** : Reaction of Auto Focus is fast. It can be used when it shoot objects moving fast.
Low : Auto Focus is more stable. In fast moving scene, AF doesn't work even though the scene is changed. It is for stabilizing the scene.

AF SENS. **HIGH → LOW → ....**

ZOOM Speed Control
: Set the zoom speed.
ZOOM SPEED **HIGH → MEDIUM → LOW**

OneShot AF TIME control
: Set the Oneshot taking time in Focus mode.
O.S. AF TIME **1sec ~ 9 sec**

Set Minimum Distance
: Set the minimum distance which can be focalized.
MIN DIST **1cm → 10cm → 50cm → 1m → 3m → 10m → infinity**

Shutter Speed Control
: Set the Shutter Speed. (Refer to. 17page Table 6-1)
At this time, Exposure mode becomes Shutter Fix mode.
SHUTTER **NORMAL→ 1/125 → ... → 1/10000 → NORMAL**

Set BAUD RATE
: Set Baudrate to communicate by RS232C, RS485, RS232TTL.
BAUD RATE **9600bps → 1200bps → 2400bps → 4800bps → 19200bps → 38400bps → 76800bps → 115kbps**

AE SENS. Control
AE SENS. **HIGH → LOW**

Set BLC Level
BLC LEVEL **24 (0 ~ 80 variable)**

Set Operating OSD display
OSD DISP **ALL → NONE → TOP → BOTTOM → ALL → ...**
ALL : Display all operating OSD (Focus mode& key action status , Zoom position , ID Display)
NONE : Clear all OSD except MENU page
TOP : Display top position OSD only (Focus mode , key action status)
BOTTOM : Display bottom position OSD only (Zoom position , ID)

6. Communication Protocol (RS-232C,RS-422)

6.1 Serial Communication

6.1.1 Communication Format

A) Data length : 1byte (8bit)
B) Start bit / Stop bit : 1bit
C) Parity bit : none
D) Baud rate : 9600bps

6.1.2 PC send 6bytes to Camera.

byte1	byte2	byte3	byte4	byte5	byte6

① byte1 : command 1
(which kind of protocol is this to communicate between A and B.)
② byte2 : command 2
③ byte3 : command 3
④ byte4 : command 4
⑤ byte5 : ID *(To communicate cameras, each camera has its ID 0~255)*
⑥ byte6 : checksum (byte1 + byte2 + byte3 + byte4 + byte5 = C/S)
Command 2 is real acting code, and command 3, 4 are decided according to command 2. (Refer to 6.2~6.16)

6.1.3 Camera send 9bytes to PC.

byte 1	byte2	byte 3	byte 4	byte5	byte 6	byte 7	byte8	byte 9

① byte1 : command 1 received from PC
② byte2 : command 2 received from PC
③ byte3 : command 3 received from PC
④ byte4 : command 4 received from PC
⑤ byte5 : send data 1
⑥ byte6 : send data 2
⑦ byte7 : send data 3
⑧ byte8 : send data 4
⑨ byte9 : checksum
(byte1 + byte2 + byte3 + byte4 + byte5 + byte6 + byte7 + byte8 = C/S)
-. *byte1 ~ 4 must be same byte1 ~ 4 which PC send to Camera.*
(If they are different , that means communication error.)
-. *send data 1 ~ 4 are decided according to command 1~ 4.*

6.2 Camera ID

6.2.1 Read Camera ID

0xC5	0xCC	dum	dum	dum	C/S

0xC5	0xCC	dum	dum	byte5	dum	dum	dum	C/S

① 0xC5 means this protocol is to communicate between PC and CAMERA.
② To communicate camera, read Camera ID first.
③ **byte5** is Camera ID.
④ dum is dummy data that can be ignored.
⑤ C/S = 0xC5 + 0xCC + 0x00 + 0x00+ 0x00 = 0x91

6.2.2 Change Camera ID

0xC5	0x78	byte3	dum	ID	C/S

0xC5	0x78	byte3	dum	dum	dum	dum	dum	C/S

① **byte3** is New Camera ID which is to change .
② ID is current Camera ID.

6.2.3 Camera ID display ON/OFF

0xC5	0xAA	0x6A	dum	ID	C/S

0xC5	0xAA	0x6A	dum	dum	dum	dum	dum	C/S

① Switch Camera ID display ON/OFF
② If the Camera ID is 0x00, then it's not displayed.

6.2.4 Camera ID display position

0xC5	0x80	dum	dum	ID	C/S

0xC5	0x80	dum	dum	dum	dum	dum	dum	C/S

① Change camera ID display position.
② Bottom Right -> Top Left -> Top Right -> No display -> Bottom Right -> …
③ Whenever this command is sent, position of ID is changed in upper order.

6.3 EEPROM

6.3.1 Read EEPROM data (front 2K byte out of 4K byte)

0xC5	0xF0	byte3	dum	ID	C/S

0xC5	0xF0	byte3	dum	byte5	dum	dum	dum	C/S

① **byte3** is EEPROM address to read (0x00 ~ 0xFF)
② ID : Camera's ID (Refer 6.2.1)
③ **byte5** is EEPROM data of EEPROM address

6.3.2 Write EEPROM data (front 2K byte out of 4K byte)

0xC5	0x0F	byte3	byte4	ID	C/S

0xC5	0x0F	byte3	byte4	dum	dum	dum	dum	C/S

① **byte3** is EEPROM address to write (0x00 ~ 0xFF)
② **byte4** is data to write on EEPROM address

6.4 White Balance Mode

6.4.1 Read WB mode

0xC5	0xAA	0x83	dum	ID	C/S

0xC5	0xAA	0x83	dum	byte5	dum	dum	dum	C/S

① **byte5** = 0x00 ; ATW mode
② **byte5** = 0x02 ; INDOOR WB mode
③ **byte5** = 0x03 ; OUTDOOR WB mode
④ **byte5** = 0x04 ; MANUAL WB mode
⑤ **byte5** = 0x05 ; AWC mode

6.4.2 Set WB mode

0xC5	0xAA	0x65	byte4	ID	C/S

0xC5	0xAA	0x65	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x00 ; ATW mode
② **byte4** = 0x02 ; INDOOR WB mode
③ **byte4** = 0x03 ; OUTDOOR WB mode
④ **byte4** = 0x04 ; MANUAL WB mode
⑤ **byte4** = 0x05 ; AWC mode

6.4.3 Set AWC mode

0xC5	0xAA	0x78	byte4	ID	C/S

0xC5	0xAA	0x78	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x00 ; AWC mode "Lock"
② **byte4** = 0x01 ; AWC mode "Push"

6.4.4 Read HUE data at the MANUAL WB mode

0xC5	0xAA	0x87	dum	ID	C/S

0xC5	0xAA	0x87	dum	byte5	dum	dum	dum	C/S

① **byte5** is the current HUE data at MANUAL WB mode (0x00 ~ 0x63).

6.4.5 Adjust HUE data at the MANUAL WB mode

0xC5	0xAA	0x77	byte4	ID	C/S

0xC5	0xAA	0x77	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x00 ~ 0x63 ; 0 ~ 99(decimal) is HUE data at MANUAL WB mode

6.4.6 Set ATW / MANUAL WB mode

0xC5	0xAA	byte3	dum	ID	C/S

0xC5	0xAA	byte3	dum	dum	dum	dum	dum	C/S

① **byte3** = 0x68 ; ATW mode
② **byte3** = 0x69 ; MANUAL WB mode
③ It is not saved.

6.4.7 Read RED data at ATW WB mode

0xC5	0xAA	0x85	dum	ID	C/S

0xC5	0xAA	0x85	dum	byte5	dum	dum	dum	C/S

① **byte5** is the current RED data at ATW WB mode.
② **byte5** = 0xFD ; -3 decimal RED data
③ **byte5** = 0xFE ; -2
④ **byte5** = 0xFF ; -1
⑤ **byte5** = 0x00 ; 0
⑥ **byte5** = 0x01 ; +1
⑦ **byte5** = 0x02 ; +2
⑧ **byte5** = 0x03 ; +3

6.4.8 Adjust RED data at ATW WB mode

0xC5	0xAA	0x75	byte4	ID	C/S

0xC5	0xAA	0x75	byte4	dum	dum	dum	dum	C/S

① **byte4** is RED data to adjust at ATW WB mode.

6.4.9 Read BLUE data at ATW WB mode

0xC5	0xAA	0x86	dum	ID	C/S

0xC5	0xAA	0x86	dum	byte5	dum	dum	dum	C/S

① **byte5** is the current BLUE data at ATW WB mode.
② **byte5** = 0xFD ; -3 decimal BLUE data
③ **byte5** = 0xFE ; -2
④ **byte5** = 0xFF ; -1
⑤ **byte5** = 0x00 ; 0
⑥ **byte5** = 0x01 ; +1
⑦ **byte5** = 0x02 ; +2
⑧ **byte5** = 0x03 ; +3

6.4.10 Adjust BLUE data at ATW WB mode

0xC5	0xAA	0x76	byte4	ID	C/S

0xC5	0xAA	0x76	byte4	dum	dum	dum	dum	C/S

① **byte4** is BLUE data to adjust at ATW WB mode.

6.5 Exposure mode

6.5.1 Read Exposure mode

0xC5	0xAA	0x84	0x00	ID	C/S

0xC5	0xAA	0x84	0x00	byte5	dum	dum	dum	C/S

① **byte5** = 0x00 ; AUTO Exposure mode
② **byte5** = 0x01 ; SHUTTER FIX Exposure mode
③ **byte5** = 0x02 ; IRIS FIX Exposure mode
④ **byte5** = 0x03 ; AGC FIX Exposure mode
⑤ **byte5** = 0x04 ; MANUAL Exposure mode

6.5.2 Set Exposure mode

0xC5	0xAA	0x60	byte4	ID	C/S

0xC5	0xAA	0x60	byte4	dum	dum	dum	dum	C/S

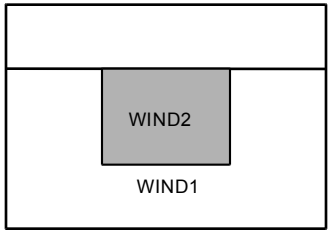
① **byte4** = 0x00 ; AUTO Exposure mode
② **byte4** = 0x01 ; SHUTTER FIX Exposure mode
③ **byte4** = 0x02 ; IRIS FIX Exposure mode
④ **byte4** = 0x03 ; AGC FIX Exposure mode
⑤ **byte4** = 0x04 ; MANUAL Exposure mode

6.5.3 Read Weighting value of Auto Exposure detection windows

0xC5	0xAA	0x6B	dum	ID	C/S

0xC5	0xAA	0x6B	dum	byte5	dum	dum	dum	C/S

① **byte5** is weighting value of AE detection windows.
(upper 4bit ; weighting value for WIND1.
lower 4bit ; weighting value for WIND2.)



< Fig 6-1. Weighting Area >

6.5.4 Adjust Weighting value of Auto Exposure detection windows

0xC5	0xAA	0x6C	byte4	ID	C/S

0xC5	0xAA	0x6C	byte4	dum	dum	dum	dum	C/S

① **byte4** is weighting value of AE detection windows to adjust Camera.
(upper 4bit ; weighting value for WIND1.
lower 4bit ; weighting value for WIND2. Refer to 6.5.3)

6.5.5 Read AGC level

0xC5	0xAA	0x8C	0x00	ID	C/S

0xC5	0xAA	0x8C	0x00	byte5	dum	dum	dum	C/S

① **byte5** is the current AGC level of Camera.

6.5.6 Adjust AGC level

0xC5	0xAA	0x7D	byte4	ID	C/S

0xC5	0xAA	0x7D	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x33 ~ 0xE8 ; AGC level of the Camera.
(only in AGC FIX or MANUAL Exposure mode : Refer to 6.5.1).

6.5.7 Set Auto Exposure Sensitivity Mode

0xC5	0xAA	0x5D	byte4	ID	C/S

0xC5	0xAA	0x5D	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x00 ; High mode - Reaction is fast.

② **byte4** = 0x01 ; Low mode - Reaction is stable.

6.6 IRIS mode

6.6.1 Set AUTO / MANUAL Iris mode (It is not saved.)

0xC5	0xAA	byte3	dum	ID	C/S

0xC5	0xAA	byte3	dum	dum	dum	dum	dum	C/S

① **byte3** = 0x66 ; AUTO Iris mode

② **byte3** = 0x67 ; MANUAL Iris mode

6.6.2 Read IRIS data

0xC5	0xAA	0x8B	dum	ID	C/S

0xC5	0xAA	0x8B	dum	byte5	dum	dum	dum	C/S

① **byte5** is the current IRIS data of Camera lens.

6.6.3 Adjust IRIS data

0xC5	0xAA	0x7C	byte4	ID	C/S

0xC5	0xAA	0x7C	byte4	dum	dum	dum	dum	C/S

① **byte4** is IRIS data of Camera lens
(only in IRIS FIX or MANUAL Exposure mode : Refer to 6.5.1).

② The range of IRIS data is 0x33 ~ 0xCD.

byte4	NTSC/PAL shutter speed	byte4	NTSC/PAL shutter speed
0x00	1/60 1/50	0x0E	1/1000
0x01	1/125	0x0F	1/1100
0x02	1/150	0x10	1/1200
0x03	1/200	0x11	1/1300
0x04	1/250	0x12	1/1500
0x05	1/300	0x13	1/1600
0x06	1/350	0x14	1/1800
0x07	1/400	0x15	1/2000
0x08	1/450	0x16	1/2500
0x09	1/500	0x17	1/3000
0x0A	1/600	0x18	1/3500
0x0B	1/700	0x19	1/4000
0x0C	1/800	0x1A	1/6000
0x0D	1/900	0x1B	1/10000

< Table 6-1. Shutter Speed >

6.6.4 Read Shutter Speed (Refer to. Table 6-1)

0xC5	0xAA	0x8A	0x00	ID	C/S

0xC5	0xAA	0x8A	0x00	byte5	dum	dum	dum	C/S

① **byte5** is the current counter data to control Shutter Speed

6.6.5 Adjust Shutter Speed

0xC5	0xAA	0x7B	byte4	ID	C/S

0xC5	0xAA	0x7B	byte4	dum	dum	dum	dum	C/S

① **byte4** is shutter speed of the Camera
(only in SHUTTER FIX or MANUAL Exposure mode : Refer to 6.5.1).

6.7 Focus Mode

6.7.1 Set AUTO / MANUAL Focus mode (It is not saved.)

0xC5	0xAA	byte3	dum	ID	C/S

0xC5	0xAA	byte3	dum	dum	dum	dum	dum	C/S

① **byte3** = 0x58 ; AUTO Focus mode
② **byte3** = 0x59 ; MANUAL Focus mode

6.7.2 Set Focus mode

0xC5	0xAA	0x73	byte4	ID	C/S

0xC5	0xAA	0x73	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x00 ; AUTO/MANUAL Focus mode
② **byte4** = 0x01 ; Push_Auto Focus mode

6.7.3 Save Focus mode

0xC5	0xAA	0x50	dum	ID	C/S

0xC5	0xAA	0x50	dum	dum	dum	dum	dum	C/S

① Whether current Focus mode is Auto or Manual, it is saved on EEPROM.

6.7.4 Focus Manual Adjust (only in Manual Focus mode)

0xC5	0xAA	byte3	dum	ID	C/S

0xC5	0xAA	byte3	dum	dum	dum	dum	dum	C/S

① **byte3** = 0x5A ; FOCUS as FAR
② **byte3** = 0X5B ; FOCUS as NEAR
③ **byte3** = 0X5C ; FOCUS STOP

6.7.5 Set Auto Focus Sensitivity Mode

0xC5	0xAA	0x5E	byte4	ID	C/S

0xC5	0xAA	0x5E	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x00 ; High mode - Reaction is fast.
② **byte4** = 0x01 ; Low mode - Reaction is stable.

6.7.6 Adjust One-shot Auto Focus Time

0xC5	0x58	byte3	dum	ID	C/S

0xC5	0x58	byte3	dum	dum	dum	dum	dum	C/S

① **byte3** = 0x01 ~ 0x09 ; The unit is seconds.

6.7.7 Adjust Minimum Distance

0xC5	0x59	byte3	dum	ID	C/S

0xC5	0x59	byte3	dum	dum	dum	dum	dum	C/S

① **byte3** = 0x00 - 1cm, 0x01 - 10cm, 0x02 - 50cm, 0x03 - 1m,
0x04 - 3m, 0x05 - 10m, 0x06 - Infinity.

6.8 PRESET

6.8.1 Read Lens Zoom Position & Digital Zoom data

0xC5	0x36	dum	dum	ID	C/S

0xC5	0x36	dum	dum	byte5	byte6	byte7	dum	C/S

① **byte5** = upper byte of Lens Zoom Position.

② **byte6** = lower byte of Lens Zoom Position.

③ **byte7** = Digital Zoom data

6.8.2 Read Lens Focus Position

0xC5	0x37	dum	dum	ID	C/S

0xC5	0x37	dum	dum	byte5	byte6	dum	dum	C/S

① **byte5** = upper byte of Lens Focus Position.

② **byte6** = lower byte of Lens Focus Position.

6.8.3 Internal Preset – It is to use EEPROM.

6.8.3.1 Write Zoom Position, Focus Position , D.zoom Data on EEPROM (rear 2K byte out of 4K byte)

0xC5	0x1F	byte3	byte4	ID	C/S

0xC5	0x1F	byte3	byte4	dum	byte6	dum	dum	C/S

① **byte3** is EEPROM address to write (0x00 ~ 0xFF)

② **byte4** is partial data to write on EEPROM.

③ You have to write 4byte to save one preset data (Refer to ④~⑧ example)

④ lower byte of lens zoom position (preset data 0) on address 0x00

⑤ lower byte of lens focus position (preset data 0) on address 0x01

⑥ low 4bit of upper byte of lens zoom position (preset data 0) on address 0x02 upper 4bit

⑦ low 4 bit of upper byte of lens focus position (preset data 0) on address 0x02 lower 4bit

⑧ digital zoom data (preset data 0) on address 0x03

⑨ You can save 64 preset data. (4 x 64 = 256)

6.8.3.2 Read Zoom Position, Focus Position , D.zoom Data on EEPROM (rear 2K byte out of 4K byte)

0xC5	0xF1	byte3	dum	ID	C/S

0xC5	0xF1	byte3	dum	byte5	dum	dum	dum	C/S

① byte3 is address to read preset data.

② byte5 is partial data of preset data.

③ One preset data is composed of 4 data. (Refer to 6.8.3.1)

6.8.3.3 Store PRESET position

(Zoom position, Focus position, D.zoom data of camera lens)

0xC5	0x79	byte3	dum	ID	C/S

0xC5	0x79	byte3	dum	dum	dum	dum	dum	C/S

① Read current Zoom position data, Focus position data, D.zoom data.

② Write data of ① on EEPROM rear 2K.

③ The address of EEPROM to write is indicated by byte3, “index”.

6.8.3.4 Move to Preset Position with Non Tracking

0xC5	0x7A	byte3	dum	ID	C/S

0xC5	0x7A	byte3	dum	dum	dum	dum	dum	C/S

① byte3 is index of preset position, index is from 0 to 7 in numerical order.

② According to preset data on EEPROM, lens move to saving zoom position, focus position, d.zoom data.

③ At this time lens move to the position without zoom tracking.

6.8.3.5 Slow Auto zoom tracking moving control

0xC5	0x7D	byte3	dum	ID	C/S

0xC5	0x7D	byte3	dum	dum	dum	dum	dum	C/S

① byte3 is index of preset position, index is from 0 to 63 in numerical order.

② For example, index 0 is data on address 0x00 ~ 0x03, index 1 is data on 0x04 ~ 0x07.

③ According to preset data, lens move to saving zoom position, focus position, d.zoom data.

④ At this time lens move to the position with zoom tracking slowly.

6.8.3.6 Quick Auto Zoom Tracking moving Control

0xC5	0x7E	byte 3	dum	ID	C/S

0xC5	0x7E	byte 3	dum	dum	dum	dum	dum	C/S

① byte3 is index of preset data, index is from 0 to 63 in numerical order.

② For example, index 0 is data on address 0x00 ~ 0x03,
index 1 is data on 0x04 ~ 0x07.

③ According to preset data, lens move to saving zoom position,
focus position, digital zoom data.

④ At this time lens move to the position with zoom tracking quickly.

6.8.3.7 Read Zoom tracking PRESET status

0xC5	0x7F	dum	dum	ID	C/S

0xC5	0x7F	dum	dum	byte5	dum	dum	dum	C/S

① **byte5** = 0x00 ; Zoom tracking PRESET is completed.

② **byte5** = 0x01 ; Zoom tracking PRESET is performing currently.

6.8.4 External Preset (External Preset is to use Internal Ram of uCOM.)

6.8.4.1 Store Lens Zoom Position

0xC5	0x49	byte3	byte4	ID	C/S

0xC5	0x49	byte 3	byte 4	dum	dum	dum	dum	C/S

① **byte3** = upper nibble is index (0~15),
lower nibble is upper byte of Lens Zoom Position.

② **byte4** = lower byte of Lens Zoom Position.

6.8.4.2 Store Lens Focus Position

0xC5	0x4A	byte 3	byte 4	ID	C/S

0xC5	0x4A	byte 3	byte 4	dum	dum	dum	dum	C/S

① **byte3** = upper nibble is index (0~15),
lower nibble is upper byte of Lens Focus Position.

② **byte4** = lower byte of Lens Focus Position.

6.8.4.3 Store Lens D.zoom Position

0xC5	0x4B	byte3	byte4	ID	C/S

0xC5	0x4B	byte 3	byte 4	dum	dum	dum	dum	C/S

① **byte3** = index (0 ~ 15).

② **byte4** = D.zoom Position.

6.8.4.4 Move to Preset Position with Non Tracking

0xC5	0x4D	byte 3	dum	ID	C/S

0xC5	0x4D	byte 3	dum	dum	dum	dum	dum	C/S

① **byte3** = index (0 ~ 15).

② Move to Preset Position(Zoom, Focus, D.zoom) of index.

6.8.4.5 Slow Auto Zoom Tracking moving control

0xC5	0x7B	byte 3	dum	ID	C/S

0xC5	0x7B	byte 3	dum	dum	dum	dum	dum	C/S

① byte3 is index of preset position, index is from 0 to 15 in numerical order.

② According to preset data, lens move to saving zoom position,
focus position, d.zoom data.

③ At this time lens move to the position with zoom tracking slowly.

6.8.4.6 Quick Auto Zoom Tracking Moving Control

0xC5	0x7C	byte 3	dum	ID	C/S

0xC5	0x7C	byte 3	dum	dum	dum	dum	dum	C/S

① byte3 is index of preset position, index is from 0 to 15 in numerical order.

② According to preset data, lens move to saving zoom position,
focus position, d.zoom data.

③ At this time lens move to the position with zoom tracking quickly.

6.9 ZOOM

6.9.1 Set Digital Zoom mode

0xC5	0xAA	0x6E	byte4	ID	C/S

0xC5	0xAA	0x6E	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x00 ; Digital Zoom mode OFF

② **byte4** = 0x01 ; Digital Zoom mode ON

6.9.2 Read Digital Zoom Power

0xC5	0xAA	0x8F	0x00	ID	C/S

0xC5	0xAA	0x8F	0x00	byte5	dum	dum	dum	C/S

① **byte5** = 0x02 ; “x2”.

② **byte5** = 0x03 ; “x3”

③ **byte5** = 0x04 ; “x4”

④ **byte5** = 0x05 ; “x5”

⑤ **byte5** = 0x06 ; “x6”

⑥ **byte5** = 0x07 ; “x7”

⑦ **byte5** = 0x08 ; “x8”

6.9.3 Set Digital Zoom Power

⑧ It is valid only when Digital Zoom mode is ON

0xC5	0x52	byte3	dum	ID	C/S

0xC5	0x52	byte3	dum	dum	dum	dum	dum	C/S

① **byte5** is Digital Zoom Power (Refer to 6.9.3)

② It is valid only when Digital Zoom mode is ON.

③ In case that Digital Zoom Power is “x2”, End Zoom is “x23 ~ x46”.

6.10 Backlight Mode

6.10.1 Set Backlight mode

0xC5	0xAA	0x70	byte4	ID	C/S

0xC5	0xAA	0x70	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x00 ; Backlight mode OFF

② **byte4** = 0x01 ; Backlight mode ON

③ Auto is prior to ON/OFF in Backlight mode.

6.10.2 Set Backlight mode (It is saved on EEPROM.)

0xC5	0xAA	byte3	dum	ID	C/S

0xC5	0xAA	byte3	dum	dum	dum	dum	dum	C/S

① **byte3** = 0x56 ; Backlight mode ON

② **byte3** = 0x57 ; Backlight mode OFF

6.10.3 Set Auto Backlight mode (It is not saved on EEPROM.)

0xC5	0xAA	0x6D	byte4	ID	C/S

0xC5	0xAA	0x6D	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x01 ; Auto Backlight mode ON

② **byte4** = 0x00 ; Auto Backlight mode OFF

6.10.4 Read Auto Backlight Area

0xC5	0x84	dum	dum	ID	C/S

0xC5	0x84	dum	dum	byte5	dum	dum	dum	C/S

① **byte5** is current Auto Backlight area.

Bit5,6,7	N/C	
Bit4	1: Area 5 ON	0: Area 5 OFF
Bit3	1: Area 4 ON	0: Area 4 OFF
Bit2	1: Area 3 ON	0: Area 3 OFF
Bit1	1: Area 2 ON	0: Area 2 OFF
Bit0	1: Area 1 ON	0: Area 1 OFF

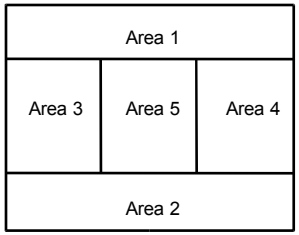
< Table 6-2. Auto BLC area bit >

6.10.5 Set Auto Backlight Area

0xC5	0x85	byte3	dum	ID	C/S

0xC5	0x85	byte3	dum	dum	dum	dum	dum	C/S

① **byte3** is Auto Backlight area to set. (Refer to. 6.10.4)



< Fig 6-2. Auto BLC area >

6.10.6 Set Auto Backlight Area display mode ON/OFF

0xC5	0x86	byte3	dum	ID	C/S

0xC5	0x86	byte3	dum	dum	dum	dum	dum	C/S

① **byte3** = 0x00 ; Auto Backlight Area is not displayed.

② **byte3** = 0x01 ; Auto Backlight Area is displayed.

6.10.7 Read Backlight level

0xC5	0xAA	0x61	dum	ID	C/S

0xC5	0xAA	0x61	dum	byte5	dum	dum	dum	C/S

① **byte5** is the current Backlight level of Camera.

6.10.8 Adjust Backlight level

0xC5	0xAA	0x62	byte4	ID	C/S

0xC5	0xAA	0x62	byte4	dum	dum	dum	dum	C/S

① **byte4** is the value to adjust Backlight level of Camera.

② The range is 0x00 ~ 0x50.

6.11 On Screen Display

6.11.1 Read MENU OSD display ON / OFF

0xC5	0xAA	0x8D	0x00	ID	C/S

0xC5	0xAA	0x8D	0x00	byte5	dum	dum	dum	C/S

① **byte5** = 0x00 ; MENU OSD is not displayed.

② **byte5** = 0x01 ; MENU OSD is displayed.

6.11.2 Set MENU OSD Display ON/OFF

0xC5	0xAA	0x63	byte4	ID	C/S

0xC5	0xAA	0x63	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x00 ; Set MENU OSD Display OFF
(Once it is displayed as “SAVE?” or “QUIT?”, and twice it is not displayed.)

② **byte4** = 0x01 ; Set MENU OSD Display ON

6.11.3 Set OSD display language

0xC5	0x87	byte3	dum	ID	C/S

0xC5	0x87	byte3	dum	dum	dum	dum	dum	C/S

① **byte3** = 0x00 ; English OSD

② **byte3** = 0x01 ; Korean OSD

③ **byte3** = 0x02 ; Chinese OSD

6.11.4 Read Operating OSD display mode

0xC5	0xAA	0x8E	0x00	ID	C/S

0xC5	0xAA	0x8E	0x00	byte5	dum	dum	dum	C/S

① **byte5** = 0x00 ; Whole Operating OSD OFF

② **byte5** = 0x01 ; Only Top line Operating OSD ON

③ **byte5** = 0x02 ; Only Bottom line Operating OSD ON

④ **byte5** = 0x03 ; Whole Operating OSD (except Camera ID) ON

6.11.5 Set Operating OSD Display mode

0xC5	0xAA	0x64	byte4	ID	C/S

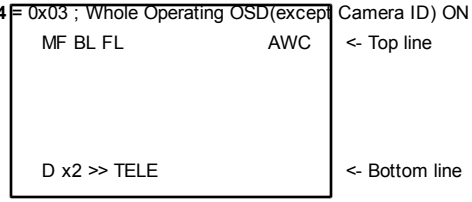
0xC5	0xAA	0x64	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x00 ; Whole Operating OSD OFF

② **byte4** = 0x01 ; Only Top line Operating OSD ON

③ **byte4** = 0x02 ; Only Bottom line Operating OSD ON

④ **byte4** = 0x03 ; Whole Operating OSD(except Camera ID) ON



< Fig 6-3. Operating OSD >

6.12 Sharpness

6.12.1 Read Sharpness level

0xC5	0xAA	0x88	0x00	ID	C/S

0xC5	0xAA	0x88	0x00	byte5	dum	dum	dum	C/S

① **byte5** is the current Sharpness level.

6.12.2 Adjust Sharpness level

0xC5	0xAA	0x79	byte4	ID	C/S

0xC5	0xAA	0x79	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x00 ~ 0x0F ; 0 ~ 15(decimal) is Sharpness level of Camera.

6.13 Brightness

6.13.1 Read Brightness level

0xC5	0xAA	0x89	0x00	ID	C/S

0xC5	0xAA	0x89	0x00	byte5	dum	dum	dum	C/S

① **byte5** is the current Brightness data

6.13.2 Adjust Brightness level

0xC5	0xAA	0x7A	byte4	ID	C/S

0xC5	0xAA	0x7A	byte4	dum	dum	dum	dum	C/S

① **byte4** = this value(00~99 decimal) is Brightness level of Camera.

6.14 Digital Effect

6.14.1 Read the current Digital Effect status

0xC5	0xAA	0x82	0x00	ID	C/S

0xC5	0xAA	0x82	0x00	byte5	dum	dum	dum	C/S

① **byte5** is data contain the current Digital Effect status

Bit7	N/C	
Bit6	1: Mosaic ON	0: Mosaic OFF
Bit5	1: Mono ON	0: Mono OFF
Bit4	N/C	
Bit3	1: Negative ON	0: Negative OFF
Bit2	1: Mirror ON	0: Mirror OFF
Bit1	1: Art ON	0: Art OFF
Bit0	1: Cinema ON	0: Cinema OFF

< Table 6-3. Digital effect bit >

6.14.2 Set Color mode

0xC5	0xAA	0x71	byte4	ID	C/S

0xC5	0xAA	0x71	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x00 ; Color mode OFF

② **byte4** = 0x01 ; Color mode ON

6.14.3 Set Negative mode

0xC5	0xAA	0x72	byte4	ID	C/S

0xC5	0xAA	0x72	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x00 ; Negative mode OFF

② **byte4** = 0x01 ; Negative mode ON

6.14.4 Set Screen Inversion (Full Mirror) ON/OFF

0xC5	0xAA	0x7F	byte4	ID	C/S

0xC5	0xAA	0x7F	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x00 ; Screen Inversion mode OFF

② **byte4** = 0x01 ; Screen Inversion mode ON

6.14.5Set Flickerless mode

0xC5	0xAA	0x74	byte4	ID	C/S

0xC5	0xAA	0x74	byte4	dum	dum	dum	dum	C/S

① **byte4** = 0x00 ; Flickerless mode OFF

② **byte4** = 0x01 ; Flickerless mode ON

6.14.6 Set FADE ON/OFF

0xC5	0xAA	byte3	dum	ID	C/S

0xC5	0xAA	byte3	dum	dum	dum	dum	dum	C/S

① **byte3** = 0x54 ; FADE ON

② **byte3** = 0x55 ; FADE OFF

6.15 Reset

0xC5	0x4F	0x00	0x00	ID	C/S

0xC5	0x4F	0x00	0x00	dum	dum	dum	dum	C/S

① Reset u-COM, and POWER OFF & ON.

6.16 Read / Set status of Camera

6.16.1 Read the current status 1 of the Camera

0xC5	0xAA	0x80	0x00	ID	C/S

0xC5	0xAA	0x80	0x00	byte5	dum	dum	dum	C/S

① **byte5** is data contain the current status 1 of the Camera

Data	1	0
Bit7	Focus Manual	Focus Auto
Bit6	Camera ID Display ON	Camera ID Display OFF
Bit5	AWC Push	AWC Lock
Bit4	Backlight ON	Backlight OFF
Bit3	Flickerless ON	Flickerless OFF
Bit2	A/M Key : Push_Auto or AUTOMANUAL	Focus : AUTO or MANUAL
Bit1	Digital Zoom ON	Digital Zoom OFF
Bit0	Initial MENU data	Not Initial MENU data

< Table 6-4. Camera status 1 >

6.16.2 Read the current status 2 of the Camera

0xC5	0xAA	0x81	0x00	ID	C/S

0xC5	0xAA	0x81	0x00	byte5	dum	dum	dum	C/S

① **byte5** is data contain the current status 2 of the Camera

Bit7	N/C	
Bit6	N/C	
Bit5	N/C	
Bit4	00 : Zoom Speed Slow, 01 : Zoom Speed Medium 10 : Zoom Speed High	
Bit3		
Bit2	1 : AE SENS Low	0 : AE SENS High
Bit1	1 : AF SENS Low	0 : AF SENS High
Bit0	1 : Auto Backlight ON	0 : Auto Backlight OFF

< Table 6-5. Camera Status 2 >

6.16.3 Set the status 1 of the Camera

0xC5	0x89	byte3	dum	ID	C/S

0xC5	0x89	byte3	dum	dum	dum	dum	dum	C/S

① **byte3** is data contain status 1 of the Camera(Refer to. 6.16.1)

6.16.4 Set the status 2 of the Camera

0xC5	0x8A	byte3	dum	ID	C/S

0xC5	0x8A	byte3	dum	dum	dum	dum	dum	C/S

① **byte3** is data contain status 2 of the Camera(Refer to. 6.16.2)

6.17 Key Action

6.17.1 Key Action (This action needs stop command)

0xC5	0x5F	bye3	0x00	ID	C/S

0xC5	0x5F	byte3	0x00	dum	dum	dum	dum	C/S

① **byte3** =key code.

② This action is finished after you send 0xC5, 0x5F, 0x0C, 0x00, 0x01, 0x31.

Key Code	Description
0x00	No Key Action.
0x01	Zoom tracking to TELE by Normal Speed (0x08).
0x02	Zoom tracking to TELE by Quick Speed (0x0C).
0x03	Zoom tracking to WIDE by Normal Speed (0x08).
0x04	Zoom tracking to WIDE by Quick Speed (0x0C).
0x05	Switch Focus mode, Auto/Manual in Focus Auto/Manual mode. Focus in Focus Oneshot mode.(Use when you don't know current state)
0x06	Switch Focus mode, Auto or Manual
0x07	Focus in Focus Push_Auto mode
0x08	Move lens to Focus FAR by Normal Speed (0x05) at Manual Focus mode.
0x09	Move lens to Focus NEAR by Normal Speed (0x05) at Manual Focus mode.
0x0A	Move lens to Focus FAR by 1 Step at Manual Focus mode.
0x0B	Move lens to Focus NEAR by 1 Step at Manual Focus mode.
0x0E	Scroll 7 Digital Effect modes (Refer to 6.14.1)
0x0F	Increase Shutter Speed in only Shutter Fix or Manual Exposure mode
0x10	Decrease Shutter Speed in only Shutter Fix or Manual Exposure mode
0x11	Scroll 5 WB modes up (Refer to 6.4.2)
0x12	Scroll 5 WB modes down (Refer to 6.4.2)

Key Code	Description
0x13	Increase HUE in Manual WB mode
0x14	Decrease HUE in Manual WB mode
0x15	Increase Brightness in only AUTO or Shutter Fix or AGC Fix Exposure mode
0x16	Decrease Brightness in only AUTO or Shutter Fix or AGC Fix Exposure mode
0x17	Increase Sharpness
0x18	Decrease Sharpness
0x19	Switch IRIS mode, Auto/Manual (It is not saved.)
0x1A	Switch Backlight mode, ON/OFF
0x1B	Switch Flickerless mode, ON/OFF
0x1C	Switch ART mode, ON/OFF
0x1D	Switch MIRROR mode, ON/OFF
0x1E	Switch 100% Negative mode, Negative/Positive
0x20	Switch Wide mode, ON/OFF
0x21	Switch Monochrome mode, Monochrome/Color
0x22	Switch Digital Zoom mode, ON/OFF
0x23	Return to factory default state
0x24	Switch Operating OSD, ON/OFF
0x25	Switch MENU OSD, ON/OFF
0x27	OSD Menu move up
0x28	OSD Menu move down
0x29	Increase Shutter Speed in all AE mode
0x32	Switch the power of the Camera, ON/OFF
0x3A	Decrease Shutter Speed in all AE mode

Key Code	Description
0x42	Increase IRIS level in only Iris Fix or MANUAL Exposure mode.
0x43	Decrease IRIS level in only Iris Fix or MANUAL Exposure mode.
0x44	Increase AGC level in only AGC Fix or MANUAL Exposure mode
0x45	Decrease AGC level in only AGC Fix or MANUAL Exposure mode
0x48	Increase RED data in ATW WB mode
0x49	Decrease RED data in ATW WB mode
0x4A	Increase BLUE data in ATW WB mode
0x4B	Decrease BLUE data in ATW WB mode
0x4E	Set WB AWC mode “Push”
0x4F	OSD Menu Item move down
0x50	OSD Menu Item move up
0x51	Switch Focus mode, AUTO_MANUAL / Push_Auto
0x55	Switch Operating OSD Display mode (Refer to 6.11.5)
0x56	Move zoom position repeatedly (x1 -> x8 -> x1)
0x58	Turn Light ON/OFF
0x59	Scroll 5 Exposure modes up (Refer to 6.5.2)
0x5A	Scroll 5 Exposure modes down (Refer to 6.5.2)

< Table 6-6. Key function code >

6.18 Masking Privacy Zone

6.18.1 Set the page of Privacy Zone

0xC5	0x82	bye3	0x00	ID	C/S

0xC5	0x82	byte3	0x00	dum	dum	dum	dum	C/S

① **byte3** = 0x00 ~ 0x05 ; There are 6 pages.

② In order to mask Privacy Zone, first of all the page must be chosen.

6.18.2 Set the Display ON / OFF

0xC5	0x8B	bye3	0x00	ID	C/S

0xC5	0x8B	byte3	0x00	dum	dum	dum	dum	C/S

① **byte3** = 0x00 ; Non Display.

② **byte3** = 0x01 ; Display.

6.18.3 Clear the Masking Privacy Zone

0xC5	0x83	bye3	0x00	ID	C/S

0xC5	0x83	byte3	0x00	dum	dum	dum	dum	C/S

① **byte3** = 0x00 ~ 0x05 ; the page which is to be cleared.

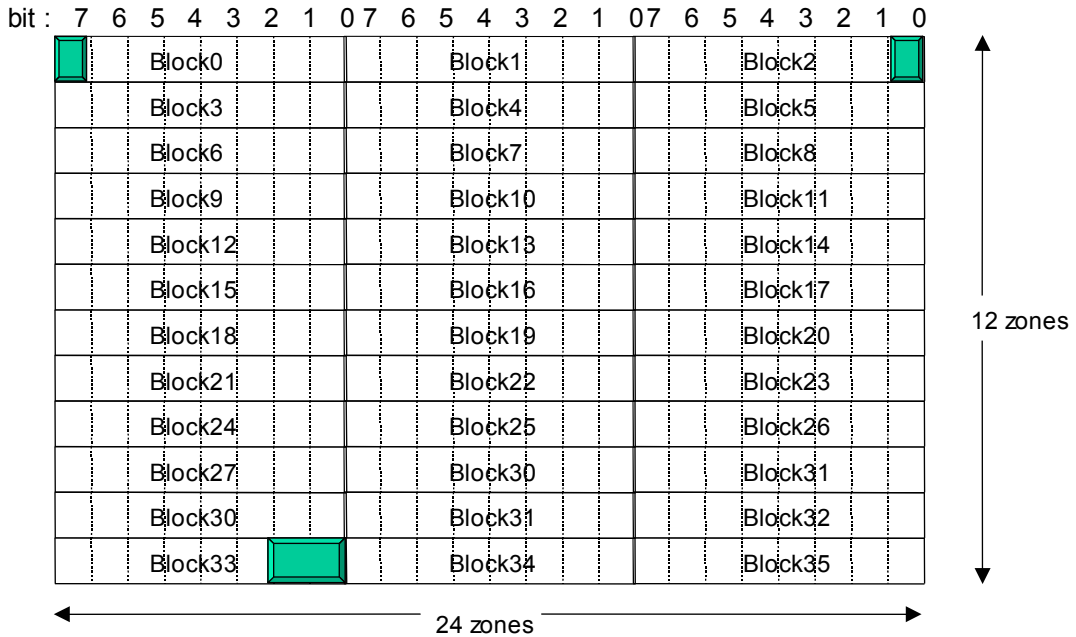
6.18.4 Set the Masking Privacy Zone

0xC5	0x81	bye3	byte4	ID	C/S

0xC5	0x81	byte3	byte4	dum	dum	dum	dum	C/S

① **byte3** ; the block number.

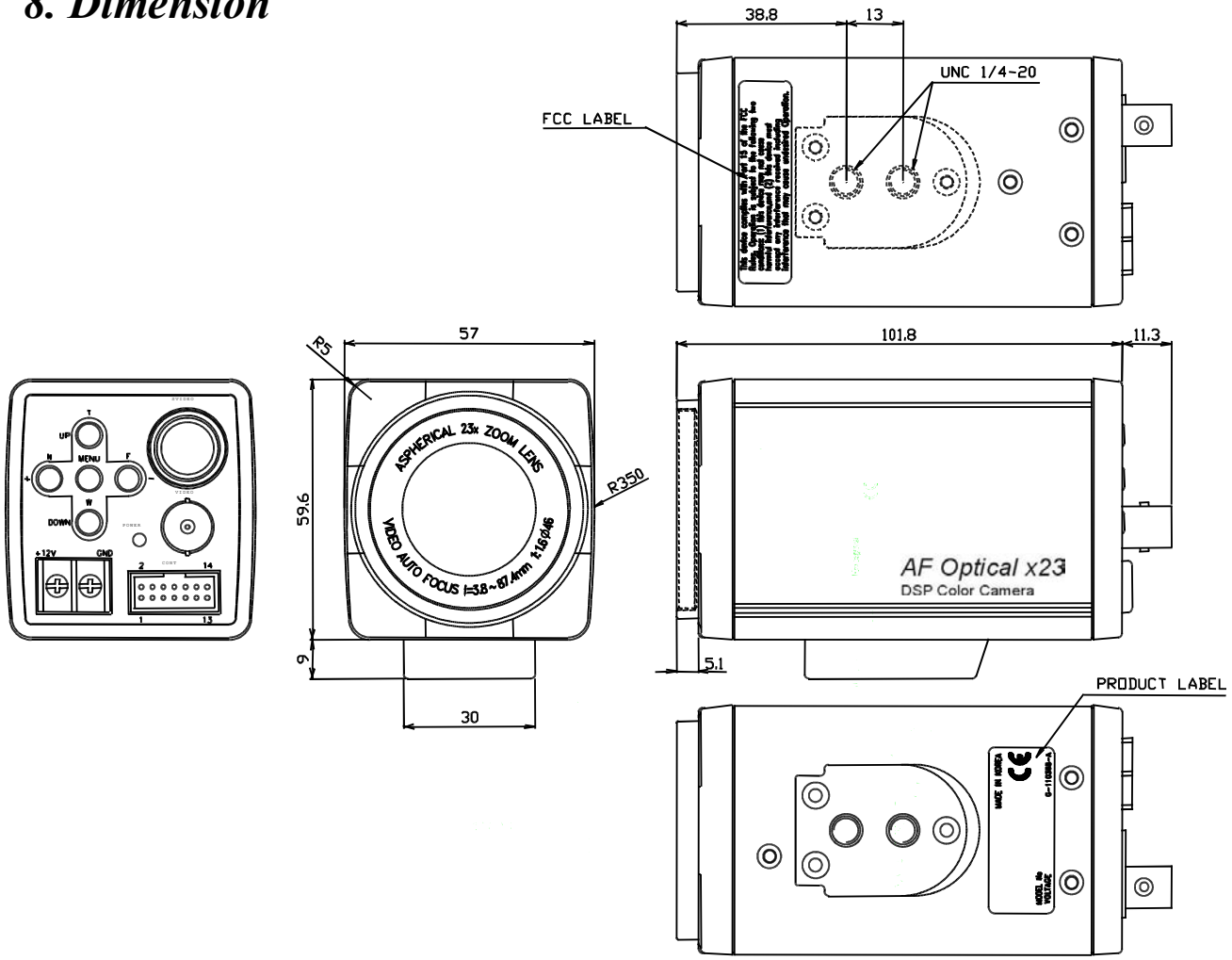
② **byte4** ; the data of block. (block0 - 0x80, block2 - 0x01, block33 - 0x03)



7. Specifications

Model Name	WDAC-2308X(NTSC)	WDAC-2308X(PAL)
Scanning System	2:1 Interlace	
Pick-up Device	1/4" SONY New Super HAD CCD	
Total / Effective Pixels	410,000/380,000 Pixels	470,000/440,000 Pixels
S/N Ratio	More than 49dB	
H. Resolution	More Than 470 TV Lines	More Than 450 TV Lines
Lens Spec.	x23 Zoom, F1.6(WIDE) ~ F3.8(TELE), f = 3.8~87.4mm	
Lens Construction	10 Elements in 7 groups (including 2 asperical lenses)	
Min. Illuminance	1.0 lx (AGC 34dB, 30 IRE)	
Digital Zoom ratio	X24 ~ x184 can be adjustable	
Sync System	Internal / External (Line pulse lock), Auto detecting selectable	
White Balance	ATW / MWB / Indoor / Outdoor / AWC	
Remote Control	RS-232C(Basic) / RS-422 , RS-485 (Option)	
On Screen Display	ON / OFF	
Video out	Composite output 75Ω terminated 1.0 Vpp, Y/C Separate output	
Shutter Speed Cont.	1/60~1/10000 28 Steps	1/50~1/10000 28 Steps
Flickerless Mode	ON(Shutter Speed 1/100) / OFF	ON(Shutter Speed 1/120) / OFF
Backlight Comp.	ON / OFF / AUTO	
AGC Control	OFF ~ 38dB adjustable	
Zoom Speed	High / Medium / Low	
Operating Temp.	-5℃ ~ 60℃(Recommendation -5℃ ~ 50℃) , 0% RH ~ 90% RH	
Storage Temp.	-10℃ ~ 60℃ , 0% RH ~ 90% RH	
Power Supply	DC 12±1V	
Power Consumption	Max 4.5W(Motor active) , 3.0W (Motor Stop)	
Dimensions (WxHxD)	57 x 59.6 x 101.8 (mm)	
Weight	410 g	

8. Dimension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R5
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101.8
11.3
5.1
AF Optical x23
DSP Color Camera
PRODUCT LABEL
T
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W
MENU
F
DOWN
+12V
GND
2
14
1
13

MEMO

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